

ETHEOSTOMA TALLAPOOSAE AND *E. brevirostrum*, TWO NEW DARTERS,  
SUBGENUS *Ulocentra*, FROM THE ALABAMA RIVER DRAINAGE

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ABSTRACT

*Etheostoma tallapoosae* and *E. brevirostrum*, two new darters, subgenus *Ulocentra*, are described from the Mobile basin. *Etheostoma tallapoosae* is confined to the Tallapoosa River system of Alabama and Georgia, and it is the only species of *Ulocentra* in that system. It lacks a red ocellus in the spinous dorsal fin and has additional coloration suggesting that its affinities are with the several undescribed *Ulocentra* occurring on the Gulf Coastal Plain. *Etheostoma brevirostrum* is confined to the upper Coosa River system of Alabama, Georgia, and Tennessee, where it is occasionally sympatric with *E. (Ulocentra) coosae* and narrowly allopatric from an undescribed *Ulocentra* that occurs in tributaries to the middle portion of the Etowah River. *Etheostoma brevirostrum* males are unique among *Ulocentra* in having red blotches surrounded by white or yellow on the lower side, and they uniquely share a median red band in the anal fin with *E. etnieri* of middle Tennessee and *E. pyrrhogaster* of northwestern Tennessee and southwestern Kentucky. *Etheostoma tallapoosae* has a small geographic distribution, but is locally abundant. *Etheostoma brevirostrum* is an uncommon species, known from few localities, and warrants consideration for protected status.

INTRODUCTION

The subgenus *Ulocentra* sensu Bouchard (1977) and Bailey and Etnier (1988) contains ten described species and four or five undescribed species in addition to the two species described here. Members of this subgenus, commonly called the snubnose darters, occur in Gulf Coastal drainages east of the Mississippi River, several eastern tributaries to the lower Mississippi River, the Tennessee and Cumberland River drainages, and southern tributaries to the Ohio River. They are absent from Atlantic slope drainages and the area west of the Mississippi River. In addition to the above papers, which include descriptions of three new species of *Ulocentra*, Page and Burr (1982) described three *Ulocentra* species from the Cumberland and Ohio River drainages, and Etnier and Bailey (1989) described an additional species shared by the Cumberland and Tennessee River drainages. Thus, seven of the ten recognized nominal species in the subgenus have been described since 1977.

Snubnose darters are typically inhabitants of flowing pools and gentle riffle areas in small streams, where they are often very common. They are small—

moderate-sized darters, not known to exceed 70 mm standard length. Males of most species maintain considerable red and orange color throughout the year, these intensifying and blue and green colors often appearing during the early spring breeding period. During each spawning act, the female, accompanied by a male, attaches 1 egg to a hard surface, typically the side of a large rock (O'Neil, 1981; Page and Mayden, 1981; Stiles et al., 1987; Carney and Burr, 1989).

The two darters described here have been known for about three decades, but their distribution and taxonomic status relative to other *Ulocentra* species of the Gulf Coast were unclear. The Tallapoosa darter, *Etheostoma tallapoosae*, is the sole representative of the subgenus *Ulocentra* in the Tallapoosa River system, but the holiday darter, *Etheostoma brevirostrum*, occurs sympatrically with the Coosa darter, *Etheostoma coosae*, in part of the Coosa River system. There is yet another snubnose darter that occurs in the middle section of the Etowah River system, mostly upstream from *E. coosae* populations there, and isolated from *E. brevirostrum* populations that are in the extreme upper part of the Etowah system. Additional undescribed species of *Ulocentra* occur in the Alabama River drainage below the confluence of the Tallapoosa and Coosa rivers, in other parts of the Mobile basin, in drainages east of Mobile basin through the Choctawhatchee River, and in the Yazoo River system of northwestern Mississippi.

#### MATERIALS AND METHODS

Specimens of the new species and comparative material of *Etheostoma coosae* are from the collections at Auburn University (AUM), Cornell University (CU), Tulane University (TU), University of Alabama (UAIC), University of Georgia (UGAMNH), and University of Tennessee (UT). In the listing of type material, each catalog number is followed by the number of specimens seen and range of standard length (SL) in millimeters, e.g., (10, 25–48). In addition to standard compass directions (with the following “of” deleted), the following abbreviations are used: Cr. = Creek, R. = River, mi = mile(s), airmi = airmile(s), trib. = tributary, Hwy = Highway, Rd. = Road, Co. = County, T = Township, R = Range, Sec = Section. In lists of materials not designated as types, the catalog number is followed by the number of specimens seen, enclosed in parentheses. We include collection dates for all of the holiday darter material because of the scarcity of collection sites and the fact that the species has disappeared from some localities in the southern part of its known range.

Counts and measurements were made as described in Hubbs and Lagler (1958) except as follows. Transverse body scales were counted from the origin of the anal fin diagonally upward to the base of the spinous dorsal fin. Gill rakers, counted on the anterior arch on either the left or the right side, include both dorsal and ventral rudiments. Measurements were made with needle-point dial calipers and recorded to the nearest 0.1 mm. Trans-pelvic width was measured between the outer bases of the pelvic spines.

Names used for associated fish species follow Robins et al. (1980), as we have yet to see and consider the many name changes anticipated in the forthcoming edition of the List of common and scientific names of fishes from the United States and Canada. We continue to refer to the widespread stoneroller of the Mobile basin as *Campostoma anomalum*, and not as *C. oligolepis* as suggested by

Burr and Cashner (1983), since preliminary studies by one of us (D.A.E.) indicate that the same stoneroller taxon present in the Ohio River drainage (type locality for *C. anomalum*) occurs throughout the Cumberland and Tennessee River drainages and most of the Mobile basin.

***Etheostoma tallapoosae*, new species**

Tallapoosa Darter

Figures 1 and 4

*Etheostoma (Ulocentra)* sp. Jenkins, 1976 (undescribed species, distribution).

*Etheostoma* sp. Kuehne and Barbour, 1983: 99, *pl. 13* ("Tallapoosa snubnose darter," characterized, range map).

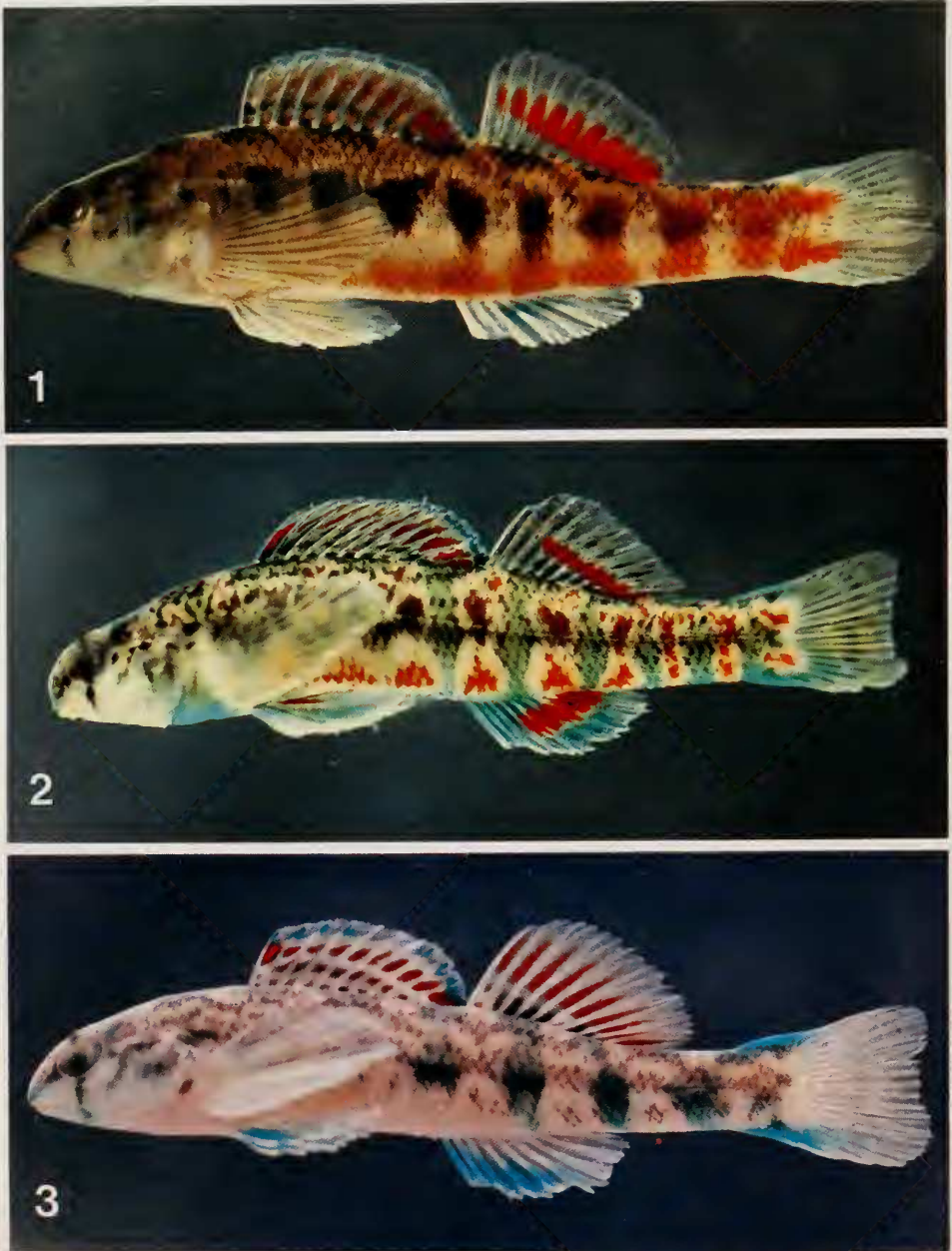
Tallapoosa darter. Page, 1983: *pl. 16E, 16F*.

**HOLOTYPE:** Adult male, TU 158215, 55.0 mm standard length, Gold Branch, tributary to Channahatchee Creek at Ala Hwy 63, 6 mi N of Eclectic (T20N, R21E, Sec 29), Elmore County, Ala, 16 March 1957, R. D. Suttkus, Rudolph J. and Helen V. Miller, and John DeAbate.

**PARATOPOTYPES:** TU 15275 (136, 30-55), collected with holotype are distributed as follows: TU 15275 (92), ANSP 167316 (4), AUM 25935 (4), CU 72359 (4), INHS 59305 (4), SIUC 18163 (4), UAIC 10016.01 (4), UF 84454 (4), UGAMNH 2167 (4), UMMZ 218251 (4), USNM 314352 (4), and UT 91.3925 (4); TU 12084 (4, 35-44), 5 October 1955; TU 41116 (45, 35-52), 12 April 1966; TU 152230 (7, 35-48), 14 May 1988; UT 91.3537 (13, 49-64), 12 March 1989; TU 157633 (11, 28-56), 23 March 1990; and TU 157803 (4, 48-55), 12 April 1990. Additional paratypes from Gold Branch at Elmore Co. Rd. 357, 1.7 mi SE Ala Hwy 63, Jordan. T20N, R21E, Sec 29, Elmore Co.: TU 152243 (15, 35-51), 14 May 1988; TU 157646 (18, 36-61), 23 March 1990; and TU 157793 (19, 30-51), 12 April 1990.

**OTHER PARATYPES: TALLAPOOSA RIVER SYSTEM, ALABAMA. ELMORE COUNTY:** TU 41137, (3, 32-36), Channahatchee Cr., 2.5 mi S Red Hill, T19N, R21E, Sec 10; UAIC 9700.10 (1, 51), Channahatchee Cr., 2.3 mi N Eclectic, Ala Hwy 63, T20N, R20E, Sec 35; UAIC 1363.10 (2, 43-47), trib. to Stearns Cr., 1.3 mi E Ala Hwy 9, 1.8 mi S Semen, T20N, R20E, Sec 17. **COOSA COUNTY:** UAIC 1359.15 (7, 23-39) and TU 158249 (8, 37-44), Okachoy Cr., 5.8 mi NE Equality, Ala Hwy 259, T21N, R20E, Sec 2. **TALLAPOOSA COUNTY:** AUM 2410 (1, 35), Saugahatchee Cr., 2.4 mi N Reeltown, Ala Hwy 49, T19N, R22E, Sec 13; AUM 16432 (1, 39), Blue Cr., 6.6 mi SSW Camp Hill, Ala Hwy 50, T20N, R23E, Sec 13; UT 91.1980 (7, 31-49), unnamed trib. to South Sandy Cr., 1 mi N US Hwy 280, 3.7 mi SE junction Hwy 280 and Co. Rd. 89, T21N, R24E, Sec 28; UAIC 1486.10 (4, 38-49), Manoy Cr. just E Jackson Gap, US Hwy 280, T22N, R22E, Sec 24; UAIC 9701.10 (25, 25-50), Elkahatchee Cr., 3.3 mi SW Alexander City, T22N, R21E, Sec 7; AUM 16413 (1, 42) and UAIC 1040.11 (2, 39-41), Hillabee Cr., 6.2 airmi NE Alexander City, Ala Hwy 22, T23N, R22E, Sec 16; AUM 16814 (20, 30-46) and TU (157616 (1, 41), Josie Leg Cr., trib. to Hillabee Cr., 6.6 airmi NE Alexander City, Ala Hwy 22, T23N, R22E, Sec 9; UAIC 1542.06 (8, 28-43), Hackney Cr., 1 mi S Hackneyville, Ala Hwy 63, T24N,





Figures 1–3. *Etheostoma* species from Alabama. 1. *E. tallapoosae*, TU 157803, paratype, adult male, 55 mm SL. Gold Branch, tributary to Channahatchee Creek, at Alabama Hwy 63, 6.0 miles north of Eclectic (T20N, R21E, Sec 29), Elmore County, Alabama, 12 April 1990, R. D. Suttkus and J. M. Pierson. 2. *E. brevirostrum*, TU 158216, holotype, adult male, 41 mm SL. Shoal Creek, tributary to Choccolocco Creek at Pine Glen Recreation Area, 8.1 miles north of US Hwy 78 (T15S, R10E, Sec 16), Cleburne County, Alabama, 10 May 1989, R. D. Suttkus and J. M. Pierson. 3. *E. coosae*, AUM 25941, male, 45 mm SL. East Fork Hatchet Creek at Coleta (T20S, R6E, Sec 21), Clay County, Alabama, 15 April 1989, J. M. Pierson. Photographs by J. M. Pierson.



R21E, Sec 23; UAIC 8473.13 (1, 28), Little Hillabee Cr., 2.3 mi ENE Hackneyville, T24N, R22E, Sec 7; UAIC 9348.11 (3, 19-53), Enitachopco Cr., 5.8 mi NW New Site at gravel road, T24N, R22E, Sec 3; UAIC 1523.02 (8, 39-40), Timbergut Cr., W New Site, Ala Hwy 22, T24N, R23E, Sec 31. CLAY COUNTY: UAIC 1543.06 (2, 30-41), unnamed trib. to Little Hillabee Cr., 5.1 mi N Hackneyville, T22S, R7E, Sec 10; UAIC 1038.12 (15, 27-44) and TU 41160 (12, 33-45), Little Hillabee Cr., 1.0 mi SW Millerville, Ala Hwy 9, T21S, R7E, Sec 20; UAIC 9311.14 (10, 39-58), Enitachopco Cr., 5.7 mi ESE Millerville at gravel road, T21S, R8E, Sec 32; AUM 16418 (4, 35-54), Enitachopco Cr., 3.8 airmi SSE Ashland, T21S, R8E, Sec 7; UAIC 1039.08 (28, 28-57), TU 29891 (30, 33-56), TU 32737 (21, 38-59), TU 40656 (57, 35-61), UAIC 2152.07 (3, 44-57), UAIC 3020.05 (2, 48-49), UAIC 8445.06 (4, 42-54), and TU 157781 (2, 42-54), Enitachopco Cr., 2.9 mi SW Ashland, Ala Hwy 9, T20S, R8E, Sec 31; AUM 19608 (3, 24-46), Enitachopco Cr., 2.1 airmi SW Ashland, Co. Rd. 34, T20S, R7E, Sec 25. LEE COUNTY: AUM 16399 (8, 32-51), Bird Cr., trib. to Saugahatchee Cr., 4.7 airmi N Loachapoka, T19N, R24E, Sec 2; AUM 20404 (1, 37), Loblockee Cr., Macon Mill, 3.7 airmi N Loachapoka, T19N, R25E, Sec 6; UAIC 1566.02 (2, 37-40), Macon Mill Cr. at Co. Rd. 11, N Loachapoka, T19N, R25E, Sec 2; AUM 15201 (2, 36-40), Little Loblockee Cr., 3.9 mi SE Waverly, US Hwy 280, T20N, R25E, Sec 23; UAIC 1529.11 (1, 29), trib. to Saugahatchee Cr., 0.6 mi SE Macon Mill, Co. Rd. 11, T19N, R25E, Sec 8. CHAMBERS COUNTY: AUM 20966 (32, 23-55), South Fork Sandy Cr., 2.8 mi ENE Waverly, T20N, R25E, Sec 11.

ADDITIONAL MATERIAL EXAMINED BUT NOT DESIGNATED AS TYPES: TALLAPOOSA RIVER SYSTEM, ALABAMA. TALLAPOOSA COUNTY: UAIC 7779.08 (4), UAIC 7780.10 (2), UAIC 7784.12 (10), UAIC 7791.11 (10), UAIC 7792.11 (5), UAIC 8486.21 (9), UAIC 8495.18 (3), UAIC 8499.11 (4), UAIC 8518.07 (2), UAIC 8523.11 (3), and UAIC 9274.11 (1), Emuckfaw Cr., 3.3 mi SSE New Site, Ala Hwy 49, T23N, R23E, Sec 9; AUM 22089 (15), Emuckfaw Cr., 5.5 airmi NE New Site, T24N, R24E, Sec 18; UAIC 1534.06 (1), Tallapoosa R., Ala Hwy 49, Horse Shoe Bend area, T23N, R23E, Sec 15; UAIC 9704.01 (11), Sweetwater Cr., 5.2 mi SW Daviston, T23N, R24E, Sec 7; AUM 13153 (23), Eagle or Jaybird Cr., 7.2 airmi SSE New Site, T23N, R23E, Sec 35; UAIC 8476.17 (4) and UAIC 9307.12 (1), Tallapoosa R., 6.7 mi SSW Daviston, T23N, R24E, Sec 19; UAIC 1522.05 (8), County Line Cr., S Hampton, between Hampton and Buttston, T23N, R24E, Sec 26. CHAMBERS COUNTY: UAIC 1521.07 (5), Allen Cr., 0.7 mi N Trammel Cross Rds., T23N, R25E, Sec 15; UAIC 9308.15 (2), Caty Cr., 0.5 mi SE Abanda, T24N, R25E, Sec 2; UAIC 7794.03 (1), UAIC 8475.12 (1), UAIC 8507.06 (4), UAIC 9284.15 (2), and UAIC 9305.11 (4), Tallapoosa R., 1.5 mi SSE Wadley, 1.6 mi W Abanda, T24N, R25E, Sec 4. RANDOLPH COUNTY: AUM 11203 (13), High Pine Cr., 1 mi S Dickert, T22S, R11E, Sec 11; UAIC 1378.09 (16), Jones Cr., trib. to High Pine Cr., 1 mi W Roanoke, US Hwy 431, T21S, R12E, Sec 22; UAIC 9247.18 (5), Beaverdam Cr., 1.0 mi NE Wadley at Co. Rd. 33, T22S, R10E, Sec 1; UAIC 1519.05 (17), Hurricane Cr., between Malone and Almond, T21S, R10E, Sec 27; UAIC 7781.05 (2), UAIC 8480.06 (3), UAIC 8497.02 (2), UAIC 8506.06 (2), UAIC 8508.12 (5), UAIC 8511.03 (3), UAIC 8520.03 (1), UAIC 9286.08 (3), UAIC 9292.06 (10), UAIC 9299.08 (2), and UAIC 9304.11 (5), Tallapoosa R., 4.0 mi NNW Wadley, T21S, R10E, Sec 26; UAIC 1518.11 (1), Cornhouse Cr., across Tallapoosa R. from Malone, at field road, T21S, R10E, Sec 11; UAIC 6793.20 (5), UAIC 7745.21 (15), UAIC 7746.11 (6), UAIC 7778.08 (11), UAIC 7788.04 (6), UAIC 7789.13 (2), UAIC 7790.11 (11), UAIC 7797.11 (8), UAIC 8487.13 (8), UAIC 8488.12 (5), UAIC 8489.15 (15), UAIC 8492.09 (17), UAIC 8493.13 (11), UAIC 8503.22 (9), UAIC 8505.11 (15), UAIC 9273.19 (9), UAIC 9277.18 (1), AUM 23297 (6), and AUM 23805 (9), Cornhouse Cr., 2.6 mi NE Malone, T21S, R10E, Sec 1; UT 91.2732 (3) and AUM 23923 (21), Cornhouse Cr. at Co. Rd., 6.6 airmi SSW Wedowee, T21S, R11E, Sec 6; UAIC 1379.11 (3), Cornhouse Cr., 7 mi NW Roanoke, US Hwy 431, T20S, R12E, Sec 31; UAIC 7744.15 (2), UAIC 7775.09 (1), UAIC 7795.14 (4), UAIC 7796.11 (2), UAIC 8483.08 (2), UAIC 8485.13 (2), UAIC 8487.13 (3), UAIC 8490.08 (4), UAIC 8496.10 (4), UAIC 8502.16 (2), UAIC 8504.15 (3), UAIC 8512.11 (2), UAIC 9276.23 (4), UAIC 9280.20 (3), UAIC 9301.18 (3), UAIC 9306.16 (6), and AUM 23793 (25), Crooked Cr., 4.6 mi NW Malone, T20S, R10E, Sec 31;

UAIC 9298.07 (4), Tallapoosa R., 4.6 mi SSE Ofelia near mouth of Crooked Cr., T20S, R10E, Sec 28; UAIC 1500.07 (3), Fox Cr., 7 mi E Lineville, Ala Hwy 48, T20S, R10E, Sec 6; UAIC 1506.07 (1), Tallapoosa R. at Fosters Bridge, W Milner, Co. Rd. 82, T19S, R10E, Sec 4; TU 56359 (5), Wedowee Cr., 1 mi NW Wedowee, US Hwy 431, T19S, R11E, Sec 34; TU 40671 (38) and AUM 13140 (6), Pineywood Cr., 2.9 mi W junction US Hwy 431 and Ala Hwy 82, 1 mi E Milner, T18S, R11E, Sec 31; UAIC 1497.09 (4), UAIC 9000.03 (7), and UT 91.2142 (10), Pineywood Cr., 11 mi NW Wedowee, US Hwy 431, T18S, R11E, Sec 29; UAIC 6278.08 (10) and UAIC 7163.01 (3), Pineywood Cr., Co. Rd. 19, 11.2 airmi NNW Wedowee, T18S, R11E, Sec 8; UAIC 8443.09 (3), Bear Cr., 3 mi W Woodland, Co. Rd. 97, T19S, R11E, Sec 12; UAIC 9197.07 (1), UAIC 1381.12 (3), and UT 91.1233 (4), Bear Cr., 2 mi SW Woodland, Ala Hwy 48, T19S, R12E, Sec 19; UAIC 6422.07 (2), Cane Cr., Ala Hwy 48, T19S, R12E, Sec 10; UAIC 1383.08 (31), Cohobadiah Cr., Co. Rd. 82, Newell, T18S, R12E, Sec 30; UAIC 6417.11 (14), Cutnose Cr., Ala Hwy 42, 4.0 airmi NNE Woodland, T18S, R12E, Sec 27; UAIC 9699.01 (1), Little Tallapoosa R., Meadow's Bridge, 2.0 mi ENE Newell, T18S, R12E, Sec 21; TU 158232 (1), Little Tallapoosa R., Thompson Bridge, 2.3 mi NW Graham, T18S, R12E, Sec 1. CLAY COUNTY: UAIC 1517.12 (12) and AUM 15033 (10), White Oak Cr., 1.2 mi S Cragford, T20S, R9E, Sec 35; AUM 14833 (3), AUM 14795 (3), and AUM 14881 (60), Wesobulga Cr., 2.5 airmi S Cragford, T21S, R9E, Sec 1; AUM 15743 (39) and UAIC 9310.16 (10), Wesobulga Cr., 4.5 airmi SSW Cragford, 0.7 mi W Corinth, T21S, R9E, Sec 16; UAIC 1036.09 (10), Crooked Cr. 2.3 mi S Lineville, Ala Hwy 48, T20S, R9E, Sec 19; UAIC 947.02 (1), Crooked Cr. 0.5 mi SW Lineville, Ala Hwy 48, T20S, R8E, Sec 12; UAIC 1508.09 (1), Little Ketchepedrakee Cr., 1 mi E Delta, Co. Rd. 47, T18S, R9E, Sec 25; UAIC 1501.07 (6), Ketchepedrakee Cr., 0.3 mi S Dempsey, T18S, R8E, Sec 23. CLEBURNE COUNTY: UAIC 1505.05 (7), trib. to Cohobadiah Cr. behind Rock Springs church, T17S, R11E, Sec 36; UAIC 1068.06 (15), Knakes Cr., 2 mi SW Hightower, Ala Hwy 46, T17S, R12E, Sec 20; UAIC 1069.10 (1) and AUM 16877 (1), Lockchelooge Cr., 0.5 mi E Tallapoosa R., US Hwy 431, T17S, R10E, Sec 32; UAIC 1504.08 (6), Lockchelooge Cr., 0.5 mi N Micaville, T17S, R10E, Sec 36; UT 91.2138 (11), trib. to Tallapoosa R. at Ala Hwy 9, W junction US Hwy 431, Hollis, T17S, R9E, Sec 25; UAIC 1503.07 (1), mouth of Dynne Cr., T17S, R10E, Sec 16; AUM 10055 (4), South Fork Dynne Cr., 8.2 airmi SSE Heflin, T17S, R10E, Sec 13; UAIC 1495.11 (4), Dynne Cr., 4 mi E Ala Hwy 9, Co. Rd. 19, T17S, R10E, Sec 2; UAIC 9290.11 (2), Tallapoosa R., 2.4 mi S Heflin, T16S, R10E, Sec 28; UAIC 1064.13 (5), Cahulga Cr., 0.2 mi W Heflin, US Hwy 78, T16S, R10E, Sec 17; UAIC 4501.01 (6), trib. to Cane Cr., 1 mi E Heflin, Ala Hwy 46, T16S, R10E, Sec 11; UAIC 1098.16 (13), Cane Cr., 2 mi E Edwardsville, US Hwy 78, T15S, R11E, Sec 11; UAIC 1066.10 (10), trib. to Tallapoosa R., 1.7 mi NW Tallapoosa R., Ala Hwy 46, T16S, R11E, Sec 16; UAIC 1067.07 (22), Verdin Cr., 3.2 mi E Tallapoosa R., Ala Hwy 46, T17S, R11E, Sec 3; UAIC 1319.11 (1), Kelly Cr., 0.5 mi N Lebanon, T15S, R12E, Sec 27; UAIC 1099.09 (9), Muscadine Cr., 1.3 mi E Fruithurst, US Hwy 78, T15S, R12E, Sec 5.

TALLAPOOSA RIVER SYSTEM, GEORGIA. CARROLL COUNTY: UAIC 1318.13 (2), Little Indian Cr., 5 mi N Bowdon, Co. Rd. S1813; UAIC 1307.07 (7), Juniper Cr., 1 mi E Ga Hwy 100, 8.8 mi S Tallapoosa; UAIC 1310.08 (14), Turkey Cr., 1 mi NW Mt. Zion, Co. Rd. S835; UAIC 1317.11 (5), Mountain Cr., 3 mi W Tyus, Ga Hwy 5; UAIC 1312.07 (1), Sharpe Cr., 4.5 mi N Carrollton, Ga Hwy 113. HARALSON COUNTY: UAIC 1309.09 (3), Walker Cr., 3.2 mi SW Waco, near Haralson/Carroll Co. line; UGAMNH 2054 (21), Mann Cr., Co. Rd. 165, 1.2 airmi WNW Poplar Springs; UGAMNH 2067 (16), Harris Cr., trib. to Beach Cr., 3.3 airmi WSW Buchanan, Co. Rd. 182; UGAMNH 2063 (6), trib. to Beach Cr., 2.9 airmi NNE Tallapoosa, Ga Hwy 120; UAIC 9037.09 (10), UAIC 9038.02 (3), UAIC 9039.02 (18), UAIC 9049.03 (9), UAIC 9050.02 (9), UAIC 9051.04 (17), and UAIC 1103.02 (1), Beach Cr., Ga Hwy 120, between Tallapoosa and Buchanan; UGAMNH 2065 (14), Holcomb Cr., trib. to Beach Cr., 0.1 mi S Ga Hwy 120, 4.1 airmi ENE Tallapoosa; UGAMNH 2068 (12), trib. to Tallapoosa R., 0.2 mi upstream of Co. Rd. 353/S2340 bridge, 4.6 airmi WSW Buchanan; UGAMNH 2053 (26) and UGAMNH 2070 (18), Flatwood Cr., 1.6 airmi NE Poplar Springs, Co. Rd. 194; UGAMNH 2066 (19), trib. to Tallapoosa R., 0.3 mi E Co. Rd. 191, 5.2 airmi WNW Buchanan; UGAMNH 2056 (7), Big Cr., trib. to Lassetter Cr., Co. Rd. 195, 2.8 airmi WNW Abernathys Mill; UGAMNH 2064 (6), Lassetter Cr., Co. Rd. 314, 6.8 airmi NNW Buchanan; UAIC 1104.06 (4), UGAMNH 2057 (2), and UGAMNH 2069 (4), Tallapoosa R., 4.2 mi N Buchanan, US Hwy 27; UAIC 1251.10 (6), Wircher Cr., 3.5 mi N Ga Hwy 120, 2.5 mi W junction Ga Hwy 120 and 101. PAULDING COUNTY: UAIC 1249.10 (4), Thomasson Cr., 2 mi SW Yorkville; UAIC 1248.12 (12), White Cr., trib. to Wircher Cr., 1.3 mi W Ga Hwy 101, 3 mi N junction Ga Hwy 120 and 101; UGAMNH 1548 (3), Tallapoosa R. at Co. Rd. 180; UAIC 1250.11 (1), McClendon Cr., 0.8 mi N Ga Hwy 120, 2.5 mi W junction Ga Hwy 120 and 101; UAIC 1247.07 (2), McClendon Cr. at Ga Hwy 101, 1.5 mi N junction Ga Hwy 120 and 101.

DIAGNOSIS: *Etheostoma tallapoosae* is a member of subgenus *Ulocentra* as diagnosed by Bouchard (1977) and Bailey and Etnier (1988). Further, *E. tallapoosae* lacks a premaxillary frenum and frequently has vomerine teeth, as is typical of members of the *E. duryi* species group of Bailey and Etnier (1988). In subgenus *Ulocentra*, coloration or combinations of color patterns in nuptial males are typically diagnostic. Nuptial males of *Etheostoma tallapoosae* are similar in general color pattern to males of several undescribed *Ulocentra* species of the Gulf Coastal Plain, but differ in having a row of (7-) 8-9 (-10) vertically oval to quadrated-shaped chocolate-brown blotches along the lateral line. These blotches are darkest and best defined anteriorly, and gradually fade to brownish orange or orange on the caudal peduncle (Figure 1). The blotches may be centered on the lateral line as in the color photograph, or mostly above the lateral line, especially in small or less intensely colored males. Some nuptial males have blue-green pigment present between the orange-covered, brown blotches. The uniformly broad central band of coloration in the spinous dorsal fin of the nuptial male is deep red posteriorly and gradually becomes dull brown anteriorly. *Etheostoma tallapoosae* lacks a red ocellus in the first membrane of the spinous dorsal fin, as do the undescribed *Ulocentra* species from the Gulf Coastal Plain, except for a species in the Black Warrior River system of the upper Mobile Basin.

DESCRIPTION: *Etheostoma tallapoosae* reaches a maximum of 56 mm SL (females) to 64 mm SL (males). Sexual dimorphism and apparent sexual maturity occur after 1 year's growth at about 30 mm SL (females) and 33 mm SL (males).

Frequency distributions of scale, fin ray, vertebral, and branchiostegal ray counts are presented in Tables 1-6. Lateral line complete with (44-) 47-53 (-57) scales. Transverse scale rows (13-) 14-17 (-18). Caudal peduncle scale rows (15-) 17-20 (-22). Dorsal fin with (9-) 10-11 (-12) spines and (10-) 11-12 (-13) soft rays. Anal fin with 2 spines and (6-) 7-8 (-9), modally 7, soft rays. Pectoral fin rays (13-) 14-15. Branchiostegal rays (5-4) 5-5 (6-6). Vertebrae 37-38 (-39). Cephalic sensory canals complete with 17 (1), 18 (48), or 19 (1) preoperculomandibular canal pores (sum of counts from left and right sides). Gill rakers 8 (8), 9 (15), or 10 (2), with length of longest rakers 2 to 3 times their basal width. Belly, opercle, cheek, nape, and prepectoral area covered with exposed scales. Some individuals have a mixture of exposed and embedded scales on the cheek. The breast is completely naked.

Proportional measurements appear in Tables 7-8. The males of *E. tallapoosae* have longer spinous and soft-rayed dorsal fins and longer anal fins, whereas females have greater body width, this presumably reflecting the gravid condition of some of the specimens.

Colors of living and freshly preserved nuptial individuals collected in March and April are described from Gold Branch specimens. Males with lower sides and ventral surface blotched dull brownish-orange anteriorly, becoming burnt orange posteriorly (Figure 1). The orange blotching extends dorsad to lower ends of 2 dark brown lateral blotches above anterior end of anal fin, and typically the burnt orange pigment is suffused over the last 2 or 3 lateral brown blotches (Figure 1). The anterior lateral brown blotches, as described in the



TABLE 1. Frequency distribution of lateral-line scale counts in three species of *Ulocentra* (count for holotype in boldface).

	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	N	$\bar{x}$	S.D.
<i>Etheostoma tallapoosae</i>			1	1	4	9	26	28	43	26	<b>25</b>	14	6	3	3	1		190	50.2	2.19
<i>Etheostoma coosae</i>			2	2	1	11	13	27	16	23	17	8	6	3	1	1	2	133	50.3	2.54
<i>Etheostoma brevirostrum</i>	1		3	8	16	11	21	21	18	11	7	3	<b>2</b>				122	48.5	2.32	

TABLE 2. Frequency distribution of transverse scale rows (anal to spinous dorsal) in three species of *Ulocentra* (count for holotype in boldface).

	12	13	14	15	16	17	18	19	N	$\bar{x}$	S.D.
<i>Etheostoma tallapoosae</i>		3	36	<b>66</b>	67	16	<b>2</b>		190	15.3	0.97
<i>Etheostoma coosae</i>	2	14	48	34	24	9	1	1	133	14.7	1.23
<i>Etheostoma brevirostrum</i>	1	5	<b>64</b>	39	13	1			123	14.5	0.80

TABLE 3. Frequency distribution of number of scales around caudal peduncle in three species of *Ulocentra* (count for holotype in boldface).

	15	16	17	18	19	20	21	22	N	$\bar{x}$	S.D.
<i>Etheostoma tallapoosae</i>	1	5	48	50	<b>52</b>	23	10	1	190	18.4	1.26
<i>Etheostoma coosae</i>	1	5	34	31	35	22	5		133	18.3	1.27
<i>Etheostoma brevirostrum</i>		1	44	<b>37</b>	36	4			122	18.0	0.91

TABLE 4. Frequency distribution of dorsal fin ray counts in three species of *Ulocentra* (count for holotype in boldface).

	Dorsal spines						Dorsal soft rays						N	$\bar{x}$	S.D.
	9	10	11	12			10	11	12	13					
<i>Etheostoma tallapoosae</i>	3	<b>90</b>	85	12			4	99	<b>83</b>	4	190	11.5	0.56		
<i>Etheostoma coosae</i>	18	81	33	1			10	63	55	5	133	11.4	0.69		
<i>Etheostoma brevirostrum</i>	5	41	<b>71</b>	6			26	<b>78</b>	19	123	10.9	0.60			

TABLE 5. Frequency distribution of fin ray counts in three species of *Ulocentra* (count for holotype in boldface).

	Anal soft rays					Left pectoral rays											N	$\bar{x}$	S.D.
	5	6	7	8	9	N	$\bar{x}$	S.D.	11	12	13	14	15	16					
<i>Etheostoma tallapoosae</i>	7	<b>126</b>	56	1	190	7.3	0.53	17	<b>140</b>	33	190	14.1	0.51						
<i>Etheostoma coosae</i>	6	75	50	2	133	7.4	0.59	40	86	7	133	13.7	0.54						
<i>Etheostoma brevirostrum</i>	1	5	87	<b>30</b>	123	7.2	0.53	1	42	<b>79</b>	123	13.6	0.55						

TABLE 6. Frequency distribution of number of vertebrae and number of branchiostegal rays in three species of *Ulocentra* (count for holotype in boldface).

	Vertebrae							Branchiostegal Rays						
	37	38	39	40	N	$\bar{x}$	S.D.	5-4	5-5	6-5	6-6	7-6	7-7	N
<i>Etheostoma tallapoosae</i>	25	<b>91</b>	7	123	37.8	0.49	1	<b>180</b>	4	4	1	190		
<i>Etheostoma coosae</i>	4	47	26	77	38.3	0.56	4	4	3	119	2	123		
<i>Etheostoma brevirostrum</i>	9	30	39	39	37.8	0.43	<b>117</b>	3	1	2	123			



diagnosis, are distinct because the surrounding surface is more or less of a uniform shade of pale brown. The middorsal area from occiput to the upper caudal fin base is typically blotched with 8 dark brown saddles. Some nuptial males taken from the lower Gold Branch site on 12 April 1990 displayed aquamarine to green coloration between the last 3 lateral brown blotches and this color also was suffused over the 2 saddle blotches on the caudal peduncle. The upper surface of head is dark brown, a few dark brown spots are present on upper part of opercle and cheek, and the slightly curved suborbital bar, preorbital bar, and iris are black. The lower lip, gular area, branchiostegal membranes, isthmus, lower part of cheek and opercle, and breast are bright blue-green. The pelvic and anal fins of the nuptial male are generally heavily pigmented with melanophores but exhibit considerable blue-green coloration, particularly the anal fin. The pelvic fin has some golden color suffused over anterior part of fin, and tips of the rays are milky white. The spinous and anterior soft rays of anal fin and their distal tips are milky white. The dark blue-green on the membranous areas contrasts with the milky white color on rays (Figure 1). The upper and lower margins (procurrent rays) of caudal fin are bright blue-green. The most prominent coloration of the caudal fin is the 2 elongate burnt orange blotches, 1 above and 1 below the typically paired basicaudal dark spots. The burnt orange blotches are continuous or nearly so with the burnt orange color that is suffused over the posterior lateral blotch. The rest of the caudal fin is a mixture of yellow, olive, and blue-green color. The spinous dorsal fin has a narrow pale blue border. Proximal to this is a thin line of milky white pigment and between the milky white line and a basal band or row of black blotches is a relatively broad central band. This central band is deep red posteriorly, becoming brownish anteriorly. The red covers much of the membranous area at the posterior part of fin but narrows to the central part of each membrane anteriorly. Above and below the central red area the membranes are brownish with golden flecks. Below (proximal to) the band of black blotches there is a shortened narrow band of golden brown (emphasized on rays). At the central base of the spinous dorsal fin the dark brown of the dorsal saddle patch extends onto the base of the central 4 dorsal spines and associated membranes (Figure 1). The soft dorsal fin has a prominent median red band extending from posterior rays (where it is best developed and occupies over half the height of the fin) to the anterior ray (Figure 1). Anteriorly the red band occupies about one-third the fin height and becomes more separated into individual blotches on each interradi al membrane. The distal margins of the separated projections are edged with yellow pigment. The fin distal and proximal to the red band is bluish gray. There is some extension of dark brown pigment onto the bases of the fin rays at the dorsal saddle blotch at the anterior end of the soft dorsal fin. The interradi al membranes of the pectoral fin are essentially clear. The rays are moderately pigmented with melanophores and a superficial covering of yellow and golden pigment. Nuptial females have lower side and ventral surface of head and body immaculate white. The dark preorbital bar, dark suborbital bar, and several dark spots on upper part of cheek and opercle stand out against the immaculate white of the lower surface of the head.

TABLE 7. Measurements in thousandths of standard length for *Etheostoma tallapoosae*, *E. coosae* and *E. brevirostrum*, males.

	<i>E. tallapoosae</i> (N = 25)			<i>E. coosae</i> (N = 25)			<i>E. brevirostrum</i> (N = 25)		
	Range	$\bar{x}$	S.D.	Range	$\bar{x}$	S.D.	Range	$\bar{x}$	S.D.
Standard length (mm)	43.2-61.2	48.8	3.8	40.5-57.4	50.1	4.3	38.6-49.0	45.3	2.6
Head length	236-262	249	8.1	244-269	254	7.1	235-255	244	4.5
Body depth at dorsal origin	191-220	203	8.6	190-221	207	9.2	186-206	197	5.9
Snout length	66-79	72	4.0	62-74	69	3.3	62-75	70	3.2
Orbit length	57-67	63	2.6	59-71	66	2.6	59-75	65	3.2
Spinous dorsal fin length	265-308	290	10.6	271-304	287	12.0	265-315	290	13.1
Longest dorsal spine	99-142	120	10.9	107-143	130	8.4	114-154	132	8.8
Soft dorsal fin length	242-276	260	9.3	275-343	314	20.1	238-280	260	10.4
Longest dorsal soft ray	114-146	134	7.7	148-204	176	15.5	136-156	145	5.0
Caudal peduncle length	293-328	310	9.0	288-315	303	7.4	260-307	288	13.1
Caudal peduncle depth	99-113	106	3.7	98-114	106	4.6	102-116	107	2.4
Anal fin length	227-276	246	11.4	244-288	269	14.6	230-268	247	9.3
First anal spine length	61-76	66	3.7	53-84	72	8.4	71-98	82	6.4
Longest anal soft ray	111-144	129	7.8	121-179	146	13.1	124-157	137	8.3
Caudal fin length	176-216	202	10.9	193-241	221	12.5	188-228	211	9.3
Pectoral fin length	221-271	250	14.3	227-301	269	18.7	255-295	279	9.8
Pelvic fin length	194-245	220	10.6	191-247	216	14.5	209-245	227	9.5
Trans-pelvic width	74-87	82	2.7	72-86	79	3.1	77-88	84	2.6
Maximum body width	126-164	142	7.4	119-142	131	6.5	122-157	146	6.8
Interorbital width	41-48	44	1.9	37-47	44	2.3	42-52	45	1.9

TABLE 8. Measurements in thousandths of standard length for *Etheostoma tallapoosae*, *E. coosae* and *E. breviostrum*, females.

	<i>E. tallapoosae</i> (N = 10)			<i>E. coosae</i> (N = 10)			<i>E. breviostrum</i> (N = 10)		
	Range	$\bar{x}$	S.D.	Range	$\bar{x}$	S.D.	Range	$\bar{x}$	S.D.
Standard length (mm)	38.2-45.5	42.6	2.3	42.7-50.2	45.0	2.1	42.9-47.1	44.3	1.5
Head length	238-257	245	6.1	238-263	250	8.1	230-254	242	8.1
Body depth at dorsal origin	198-219	211	9.1	202-227	216	7.4	181-196	189	4.8
Snout length	68-73	70	1.9	60-68	65	2.9	64-71	67	2.9
Orbit length	63-68	65	1.5	66-72	69	2.1	63-66	65	0.9
Spinous dorsal fin length	263-290	275	8.9	244-285	262	10.8	264-290	277	8.3
Longest dorsal spine	96-114	108	5.9	95-119	106	6.8	105-118	110	5.6
Soft dorsal fin length	240-262	251	6.9	251-288	266	12.1	236-264	253	10.7
Longest dorsal soft ray	126-156	138	8.9	131-159	144	8.5	130-148	142	6.1
Caudal peduncle length	299-316	305	9.2	295-306	302	3.7	272-296	282	7.3
Caudal peduncle depth	97-104	101	1.9	94-108	100	3.9	95-109	101	4.4
Anal fin length	220-261	237	13.6	220-244	231	9.1	222-246	230	6.8
First anal spine length	61-70	65	2.8	47-69	58	7.1	68-84	74	5.6
Longest anal soft ray	113-142	126	9.2	115-144	130	9.1	126-140	135	5.2
Caudal fin length	194-222	204	8.0	207-239	221	10.3	190-212	202	6.4
Pectoral fin length	236-273	255	11.3	254-295	273	12.9	256-302	276	16.5
Pelvic fin length	201-233	215	9.7	185-229	210	12.3	201-228	218	7.4
Trans-pelvic width	80-87	83	2.3	71-81	77	2.7	77-84	81	2.4
Maximum body width	139-170	153	13.1	137-166	150	9.0	141-158	147	5.2
Interorbital width	42-47	44	1.6	42-47	45	1.5	41-47	44	2.4



Most large females have some xanthic coloration. Often the female will have the 2 elongate (reduced in size) orange blotches on base of caudal fin, at least a posterior segment of red band in soft dorsal fin, and some orange on the lower sides. A few females had some red pigmentation on posterior central part of spinous dorsal fin. The rest of the dorsal part of the females is pigmented with various shades of brown. Invariably there is a dark brown blotch on the prepectoral area of females of all sizes. The 8–10 dark brown lateral blotches extend from the lateral line or a little above it ventrad to well below the lateral line, so that the lower two-thirds are well contrasted against the immaculate white of the lower side and belly. The lateral blotches of the females are not as uniformly nor as densely pigmented as those of the nuptial males. The upper side and dorsum is a continuous patchwork of various shades of brown, usually with 8 dorsal saddle marks. The upper area of the head is a uniform dark brown. The pelvic and anal fins are immaculate. The lower part of the pectoral fin is immaculate whereas there are dark blotches on the rays of the upper two-thirds of the fin and when the fin is spread the blotches tend to form wavy bars. The caudal fin has a similar pattern as that described for pectoral fin. There are typically 2 well separated dark elongate blotches at the base of the caudal fin. Both the spinous and soft dorsal fins also have dark blotches spaced along the rays, and a varying amount of pigment on the membranous areas.

The blues, greens, and blue-greens fade rapidly after preservation whereas the reds, oranges, and yellow fade more gradually, and some of this xanthic color may persist for several months.

**DISTRIBUTION:** *Etheostoma tallapoosae* is confined to the Tallapoosa River system above the Fall Line in the Blue Ridge and Piedmont physiographic provinces (Figure 4). Although the species is widespread throughout the system in Alabama and Georgia, there has been considerable habitat loss in recent years because of impoundment and small stream deterioration. *Etheostoma tallapoosae* is primarily an inhabitant of small to medium-size streams but does occur in the main channel of the upper Tallapoosa and Little Tallapoosa rivers.

**HABITAT AND BIOLOGY:** Gold Branch at Ala Hwy 63 (type locality) was a small stream 2 to 15 feet wide with a substrate of boulders, rubble, gravel, sand, and a few silted areas during the 1950s. Sometime between the 1960s and the mid-1980s, Ala Hwy 63 was straightened, widened, and somewhat elevated over Gold Branch. The deposition of large chunks of limestone rip-rap upstream and downstream of the new concrete culvert drastically modified the stream habitat. The land along Gold Branch above the culvert was cleared and is now a heavily grazed pasture. Spring floods have produced a deep plunge pool below the highway culvert. Thus most of the area where the early collections were made is now unsuitable darter habitat. All recently collected specimens were taken downstream from the cleared highway right-of-way, where the substrate consists of boulders and rubble, with some gravel and stretches of sand.

Based on our observations and examination of specimens in other museums, spawning takes place during March and April. There is some evidence that breeding colors of males begin to intensify in February and perhaps as early as late January. Samples taken during mid-May exhibited post-reproductive condi-

tions. Females outnumber males in the breeding concentrations. An analysis of three samples, two from the type locality, 16 March 1957 (type series), and 12 April 1966, and one from Enitachopco Creek, 13 April 1966, revealed 52 males vs 85 females, 18 males vs 27 females, and 19 males vs 38 females, respectively. Summation of the three collections results in 89 (37%) males vs 150 (63%) females. All individuals in these samples were considered to be adults based on nuptial coloration of males and elongate genital papilla of females. Males ranged in size from 33–61 mm SL ( $\bar{x}$  = 44.8 mm, SD = 4.7124) and females ranged in size from 30–52 mm SL ( $\bar{x}$  = 38.4 mm, SD = 4.3350).

The species associates of *Etheostoma tallapoosae* at the type locality, based on six collections taken between 5 October 1955 and 12 April 1990, are as follows: *Hyentelium etowanum*, *Campostoma anomalum*, *Hybopsis lineapunctata*, *Nocomis leptcephalus*, *Notropis baileyi*, *N. chrysocephalus*, *N. gibbsi*, *N. texanus*, *N. venustus*, *Semotilus atromaculatus*, *Fundulus bifax*, *Lepomis auritus*, *L. macrochirus*, *Micropterus coosae*, and *Cottus caroliniae*. A few miles downstream at the Elmore County 357 road crossing of Gold Branch several additional species were taken in three samples: *Moxostoma poecilurum*, *Notropis bellus*, and *Percina (Alvordius) sp.*

ETYMOLOGY: The epithet *tallapoosae* refers to the Tallapoosa River.

### ***Etheostoma brevirostrum*, new species**

Holiday Darter

Figures 2 and 4

*Etheostoma (Ulocentra) sp.* Boschung, 1961: 280 (misidentification of *E. coosae*). Smith-Vaniz, 1968: 102 (characterization and distribution). Stiles and Etnier, 1971: 15 (Conasauga River, Tennessee, records). Jenkins, 1976: 646 (distribution).

*Etheostoma sp.* Ramsey, 1976: 63-64 (distribution, habitat description, Alabama records). Kuehne and Barbour, 1983: 98-99, *pl. 12* ("upland snubnose darter," characterized, range map). Sizemore and Howell, 1990: 3-5 ("upland snubnose darter," distribution in springs).

HOLOTYPE: Adult male, TU 158216, 40.7 mm standard length, Shoal Creek, tributary to Choccolocco Creek at Pine Glen Recreation Area, 8.1 mi N of US Hwy 78, (T15S, R10E, Sec 16), Cleburne County, Alabama, 10 May 1989, R. D. Suttkus and J. Malcolm Pierson.

PARATOPOTYPES: TU 154765 (6, 34-42), collected with holotype; AUM 1588 (5, 34-47), 13 August 1968; TU 56167 (2, 27-32), 26 January 1969; TU 60351 (5, 35-42), 16 October 1969; AUM 9349 (1, 42), 6 August 1974; AUM 13639 (3, 28-45), 30 September 1976; UAIC 6420.04 (2, 39-41), 6 April 1981; UAIC 6626.07 (2, 39-42), 11 April 1982; UAIC 7162.01 (2, 34-40), 23 July 1984; TU 152214 (2, 32-37), 13 May 1988.

OTHER PARATYPES: COOSA RIVER SYSTEM, ALABAMA. CALHOUN COUNTY: TU 60687 (2, 37-44), Shoal Cr., 2.3 mi E White Plains at Whitesides Mill, T15S, R9E, Sec 12, October 1966; TU 57896 (1, 35), 17 June 1969; TU 66257 (5, 33-46), 15 December 1970; TU 68585 (3, 34-36), 17 March 1971; TU 74352 (1, 36), 7 December 1971; and AUM 6086 (1, 43), 4 October 1972, all from same locality; TU 59644 (64, 29-48), same locality, 14 October 1969, distributed as follows: TU 59644 (44), ANSP 167317 (2), AUM 25936 (2), CU 72360 (2),

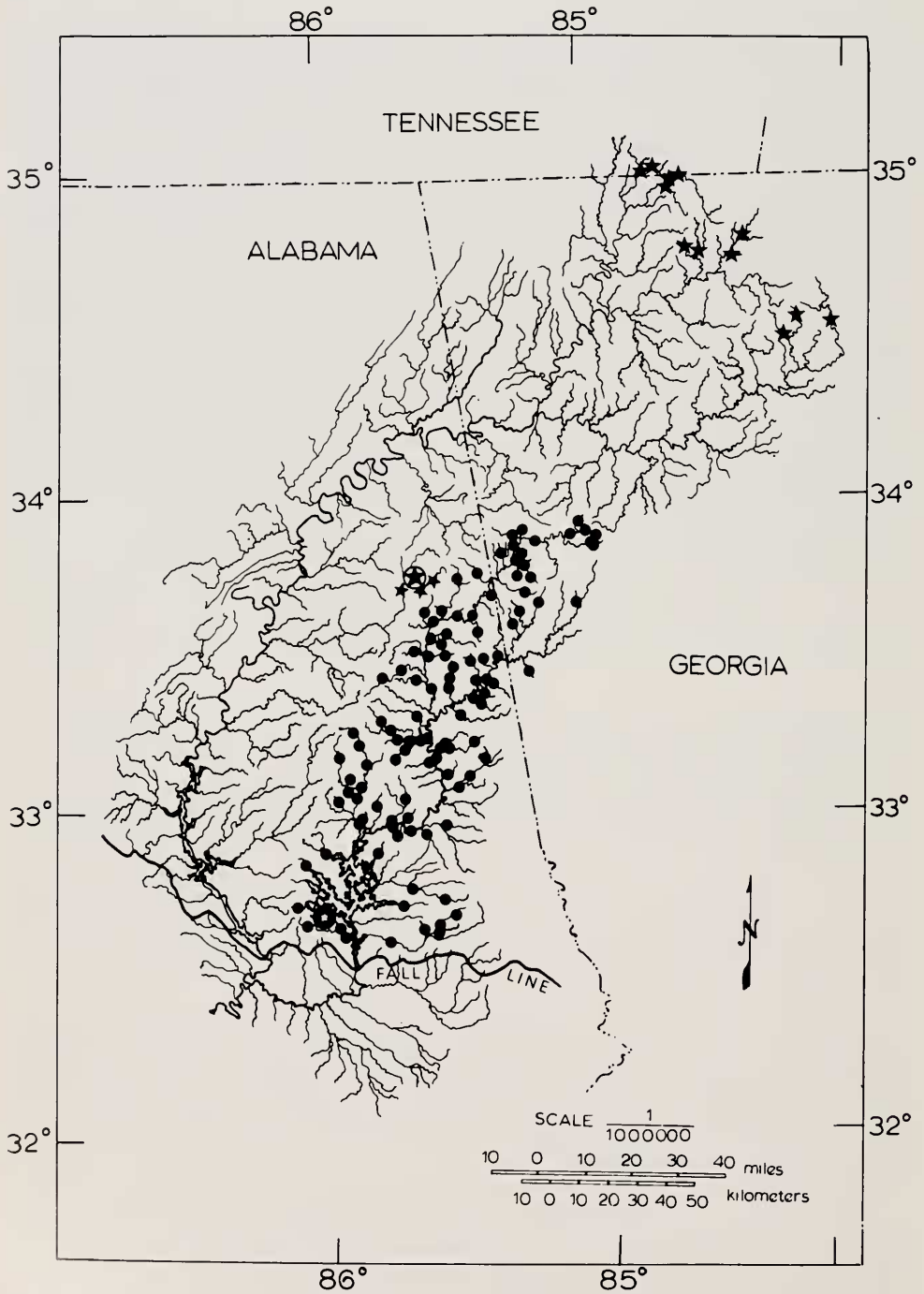


Figure 4. Distribution of *Etheostoma tallapoosae* (solid dots, type locality open star in solid spot), and *Etheostoma brevirostrum* (solid stars, type locality solid star in open circle).



INHS 59306 (2), SIUC 18164 (2), UAIC 10017.01 (2), UGAMNH 2168 (2), UMMZ 218252 (2), USNM 314353 (2), and UT 91.3926 (2); TU 66556 (1, 34), Choccolocco Cr., 1.0 mi S White Plains, Ala Hwy 9, T15S, R9E, Sec 10, 15 December 1970; AUM 11492 (3, 40-46), Shoal Cr., 5.6 airmi NW Heflin, 0.2 mi W Cleburne Co. line, T15S, R9E, Sec 24, 6 August 1974; UAIC 6489.01 (1, 48), Little Shoal Cr. at Forest Service Rd. 531, Talladega National Forest, 16 November 1980.

ADDITIONAL MATERIAL EXAMINED BUT NOT DESIGNATED AS TYPES: COOSA RIVER SYSTEM, GEORGIA. GILMER COUNTY: CU 28298 (9), Rock Cr., 7.8 mi SW Blue Ridge, 8.4 mi NE Ellijay, US Hwy 76, 3 September 1953; TU 12270 (11), same locality, 9 October 1955; FSU 2442 (8), Bear Cr., 10.3 mi NW Ellijay, 9 October 1955; TU 32784 (12), same locality, 2 June 1964; TU 38262 (1), same locality, 20 June 1965; UT 91.2105 (1), Big Turniptown Cr., 3 mi NE Ellijay, Ga Hwy 5, 13 April 1980; UT 91.2104 (2), Mountaintown Cr., 5 airmi NW Ellijay, 12 April 1980; TU 27979 (3), Conasauga Cr., trib. to Mountaintown Cr., 9.3 mi W Ellijay, US Hwy 76, 31 May 1962. MURRAY COUNTY: UT 91.1230 (1), Conasauga R., 1 mi upstream of confluence with Jacks R., 4 August 1966; UAIC 9029.05 (2), Jacks R. at Tennessee/Georgia line, 22 August 1981; UT 91.1688 (8), Conasauga R., 1.8 airmi S Tennessee/Georgia line, 0.8 mi SW Hopewell Church, Ga Hwy 2, 1 October 1978; UGAMNH 2062 (1), Conasauga R., 6.3 airmi NE Cisco along Ga Hwy 2, upstream of Hwy 2 crossing, August 1983. DAWSON COUNTY: UAIC 2910.04 (1), Amicalola Cr., 3.7 mi SW Johntown, 9.5 mi N Dawsonville, 18 April 1968; UGAMNH 2059 (1), Amicalola Cr., Co. Rd. 25, 1.8 airmi SSW junction Ga Hwy 136/183, 8 May 1990; UGAMNH 2060 (4), Cochran Cr., Co. Rd. 45, 1.0 airmi SW of junction Ga Hwy 52/342, 8 May 1990. LUMPKIN COUNTY: UGAMNH 2052 (1), Etowah R., Ga Hwy 52, 13 May 1990; UAIC 9811.09 (1), same locality, 1 June 1990.

COOSA RIVER SYSTEM, TENNESSEE. POLK COUNTY: UT 91.343 (1), Conasauga R., Boanerges Church bridge, 14 October 1969; UT 91.348 (2), Conasauga R., ford above US Hwy 411, 11 October 1969.

DIAGNOSIS: *Etheostoma brevirostrum* is a member of the subgenus *Ulocentra* as diagnosed by Bouchard (1977) and Bailey and Etnier (1988). Further, *E. brevirostrum* often has vomerine teeth and either lacks the premaxillary frenum or has a poorly developed one. Being similar to *E. etnieri* in this respect, we place *E. brevirostrum* in the *E. duryi* species group (Bailey and Etnier, 1988). It differs from all members of subgenus *Ulocentra* except *E. etnieri* and *E. pyrrhogaster* in having a median red band in the anal fin of nuptial males, and from both of those species in having a narrow (vs broad) red band in the soft dorsal fin, in addition to many other aspects of male coloration. Colors of breeding males of this species are perhaps the most distinctive of any species in the subgenus. The red blotches on the lower side are haloed by white and bright yellow. The yellow tends to fade rapidly and very little remains after a few minutes in preservative. *Etheostoma brevirostrum* has a red ocellus in the first membrane of the spinous dorsal fin (Figure 2), as do *E. coosae* and the undescribed *Ulocentra* species from the Black Warrior River system; this ocellus is lacking in *E. tallapoosae* and the several undescribed *Ulocentra* species from the area south of the Tennessee River. The red color often present on the basal part of the pelvic fins of nuptial males is absent from other species of *Ulocentra*.

DESCRIPTION: *Etheostoma brevirostrum* reaches a maximum of 47 mm SL (females) to 53 mm SL (males). Frequency distributions of scale, fin ray, vertebral, and branchiostegal ray counts are presented in Tables 1-6. Lateral line complete with (42-) 45-52 (-54) scales. Transverse scale rows (12-) 14-16 (-17). Caudal peduncle scale rows (16-) 17-19 (-20). Dorsal fin with (9-) 10-11 (-12) spines and 10-12 soft rays. Anal fin with 2 spines and (5-) 7-8, modally 7, soft rays. Pectoral fin rays (11-) 13-14. Vertebrae modally 38. Branchiostegal rays

5—5 (6—6). Cephalic sensory canals complete with 16 (1), 17 (6), 18 (42), or 19 (1) preoperculomandibular canal pores (sum of counts from left and right sides). Gill rakers 8 (6), 9 (15), or 10 (4), with length of longest rakers 2 to 3 times their basal width. Belly, opercle, cheek, and nape typically covered with exposed scales. Some individuals have a mixture of exposed and embedded scales on the cheek. Scalation variable on prepectoral area; some specimens have only a few scales whereas others have entire area covered with scales. The breast is completely naked. Proportional measurements are presented in Tables 7-8. The males of *E. brevirostrum* have median and pelvic fin lengths greater than those of females.

Colors of freshly preserved nuptial specimens are described from Shoal Creek specimens collected 13 May 1988 and 10 May 1989. Males with a prominent row of red blotches (several triangular in shape) along lower side, each blotch, and the 2 elongate red blotches at base of caudal fin, distinctly haloed with yellowish-cream to white. There is another row of small haloed red blotches along upper side of caudal peduncle and forward on upper side to below anterior insertion of spinous dorsal fin. Between the haloed blotches along lower side the surface is bright green or blue-green and this color forms 5 or 6 vertical bars from just anterior to the anal fin to the caudal fin base. Upper and lower caudal rays, including procurrent rays, are bright green or blue-green, whereas the rest of the caudal fin is less intense green and there is considerable yellowish or golden pigment along the central rays. Along the lateral line the green pigmented areas are darkened with black or dark brown, particularly on anterior half of body. There is a row of brown blotches anteriorly just above the lateral line. The brown blotches diminish in size posteriorly and become blended with the haloed red blotches. The entire dorsum is green and the dorsal saddle marks are darkened with melanophores. The occiput, snout, and breast are bright green. The cheek, opercle and gill membranes were a faint blue-green at time of capture (10 May 1989) but faded quickly.

The anal fin is distinct in coloration, having a wide, bright red diagonal band across the middle of the fin that is otherwise a solid blue-green color with a bit of milky white on the tips of the rays. The pelvic fins have a small blotch of bright red at base of median rays, whereas most of the rest of the fin is a solid blue-green color with a milky white anterior and distal border. The membranes of the pectoral fin are clear, but the rays have a light sprinkling of xanthic coloration. The second dorsal fin has a prominent, narrow red band that extends from the posterior edge of fin anterior to the second or third interradiial membrane. The upper and lower margin of red band is edged with yellowish-cream. The rest of the fin distal, anterior, and proximal to the red band has a light wash of blue-green, and there is an inconspicuous, interrupted black band above and below (but not contacting) the red band, with this pigment mostly on the membranes. There is a speckling of red on 1 or 2 rays anterior to red band. The spinous dorsal fin has a broad, centrally located red band. The band is broad and intense red on the last 3 or 4 interradiial membranes, and gradually diminishes in intensity and width anterior to the second interradiial membrane. On the first interradiial membrane the red is intense and forms the typical red ocellus that is present in many members of the subgenus. Both distally and

proximally the red band is bordered by yellowish-cream or milky white. The outer edge of the fin is blue-green, with this band wider and more intense blue-green posteriorly. The area proximal to the red band also is blue-green but a basal row of dusky spots tends to mask the color.

Females are much less colorful than males. Green is moderately developed on lateral blotches, on blotches on upper side, and on dorsal saddles. The anterior end of anal fin, upper and lower procurrent areas of caudal fin, breast, gill membranes, and gular area are pale blue-green. The nuptial female has greatly reduced red blotches on lower side and these are haloed with yellowish white. The elongate blotches at base of caudal fin are smaller and orange-red in contrast to the large, bright red blotches of the nuptial male. There are red blotches of reduced size on the upper side from base of caudal fin anteriorly. The anterior blotches in this series are greatly suffused with brown. The caudal and second dorsal fins (and to a lesser extent the first dorsal fin) have dark blotches on the rays that are aligned to form dark bands, and the rays are otherwise bright yellow to cream colored. All five nuptial females taken from Shoal Creek on 10 May 1989 had a bright red ocellus on the first interradial of the spinous dorsal fin. Additional dorsal fin red pigment is reduced to a small spot posteriorly in the second dorsal and small red spots in the posterior six or so membranes of the spinous dorsal.

In preservative, nuptial males have the breast, venter, and lower side densely pigmented with small melanophores. A few of the central areas formerly covered by the bright red blotches are lightly pigmented. The anal fin is heavily pigmented except where the red band was present and this area is now pale. The 2 basicaudal areas (formerly red) are only lightly pigmented. The basicaudal dark pigment may form a single, median spot, a short vertical bar with an upper and lower posterior projection, or 2 distinct parallel blotches separated by a pale area. The pelvic fins are heavily pigmented except for pale distal tips and anterior margin of first spine. Pectoral and caudal fin membranes are clear, and the interrupted patches of pigment on the rays form wavy bands. Most of the membranous areas of both the spinous and the soft dorsal fins are heavily pigmented with small melanophores. The areas formerly covered with red pigment, not yet entirely faded, are less densely pigmented with melanophores. The faded ocellus now appears as a pale window. Although the opercle, cheek, lateral snout area, and prepectoral area are rather heavily pigmented, the preorbital bar, suborbital bar, 2 or 3 spots on upper cheek and opercle, and 1 or 2 spots on prepectoral area are darker and contrast rather markedly with the paler background.

Nuptial females in preservative show very little dark pigment on the lips, gular area, isthmus, gill membranes, lower cheek, lower opercle, breast, belly, or areas formerly covered with red on the lower side and caudal peduncle. Some females have a small patch of melanophores located on mid-ventral part of gill membrane and a few individuals have a few melanophores on anterior border of breast and on genital papilla. There is some pigment on all fins; the pelvic and anal fins have the least. The pectoral, caudal, and both portions of the dorsal fin have interrupted patches of pigment on the rays, and when the fins are spread, wavy bands are formed. The membranous areas of the pectoral,



pelvic, anal, and caudal fins of the females are immaculate. There is a varying amount of dark pigment on membranes of the spinous and soft-rayed dorsal fins. The melanophores are mostly on the posterior membranous areas on the soft dorsal but may be on both the posterior and anterior membranes of the spinous dorsal fin. The dark preorbital bar, suborbital bar, spots on upper cheek and opercle, prepectoral spot, and lateral blotches (formerly suffused with green) contrast with the immaculate ventral area. The dark lateral blotches on the caudal peduncle extend all the way to the midventral part of the caudal peduncle in some females. Basicaudal dark pigment is as described for males.

**DISTRIBUTION:** *Etheostoma brevirostrum* is confined to the Coosa River system above the Fall Line, in the Valley and Ridge and Blue Ridge physiographic provinces. Our records show that *E. brevirostrum* has a disjunct distribution. The small isolated population in the middle and lower stretches of Shoal Creek, a tributary to Choccolocco Creek, is the only locality in Alabama. There are scattered locality records in the upper Conasauga River in northern Georgia and southern Tennessee, a few localities in the upper Coosawattee River system in northern Georgia, and a few localities in the upper Etowah River system in north-northeast Georgia (Figure 4). Two reservoirs, Whitesides Mill Lake and Highrock Lake, have possibly eliminated *Etheostoma brevirostrum* from the Calhoun County, Alabama, section of Shoal Creek. To our knowledge, no specimens have been taken from the area subsequent to the impoundments. Sizemore and Howell (1990) reported 13 specimens from three large springs in the Choccolocco Creek system.

**HABITAT AND BIOLOGY:** We have designated Shoal Creek at Pine Glen Recreation Area in Cleburne County, Alabama, as the type locality. Shoal Creek is 30 to 60 feet wide with a substrate of boulders, rubble, gravel, sand, and a few small silted areas. The water is usually clear with moderate to fast current. During the summer, beds of *Justicia* develop in the riffles and along the shallows. The banks are heavily wooded. During the 26 January 1969, 13 May 1988, and 10 May 1989 collections, Shoal Creek was clear, but during the 16 October 1969 collection it was high and very muddy. During January the water temperature was 5°C, May of 1988 it was 18°C, May of 1989 it was 17°C, and October of 1969 it was 16°C. In the upper Coosa system of Georgia and Tennessee, many *Etheostoma brevirostrum* localities are smaller and cooler than the type locality, and rooted macrophytes are absent. We know very little about the reproductive biology of *E. brevirostrum*. Based on our meager observations we assume that spawning takes place during April and May. The one nuptial male collected in 1988 and the two nuptial males collected in 1989 from Shoal Creek were taken from near boulders with small patches of sand between the boulders. The water was fast flowing, about 2–3 feet deep, 6–8 feet from the bank. Examination of UGAMNH 2060 (4), collected from Cochran Cr., Dawson Co., Georgia, on 8 May 1990 by B. J. and M. C. Freeman, and their color slide taken a short time after capture, indicate these specimens were in nuptial condition.

We have examined 185 specimens for this study and it is interesting that only 26 (14%) specimens (in 11 lots) were obtained in March, April, and May, the months during which *Ulocentra* species are aggregated for breeding and, in



our experience, most vulnerable to capture. The largest series were taken in September through December. The species associates of *Etheostoma brevirostrum* at the type locality, taken in four collections, are as follows: *Hypentelium etowanum*, *Moxostoma duquesnei*, *Campostoma anomalum*, *Notemigonus crysoleucas*, *Notropis asperifrons*, *N. callistius*, *N. trichroistius*, *N. xanocephalus*, *Rhinichthys atratulus*, *Semotilus atromaculatus*, *Ictalurus natalis*, *Noturus leptacanthus*, *Ambloplites ariommus*, *Lepomis macrochirus*, *L. megalotis*, *L. microlophus*, *Micropterus coosae*, *Etheostoma coosae*, *E. jordani*, *Percina nigrofasciata*, *P. palmaris*, and *Cottus caroliniae*.

Prior to the impoundment of Shoal Creek, the Whitesides Mill location was one our favorite collecting sites for *E. brevirostrum*. Based on two collections, one on 17 June 1969 and the other on 14 October 1969, we had the following cumulative species list: *Hypentelium etowanum*, *Moxostoma duquesnei*, *Campostoma anomalum*, *Notropis asperifrons*, *N. caeruleus*, *N. callistius*, *N. chrosomus*, *N. chrysocephalus*, *N. lirus*, *N. stilbius*, *N. trichroistius*, *N. venustus*, *N. volucellus*, *N. xanocephalus*, *Phenacobius catostomus*, *Fundulus stelleri*, *Ambloplites ariommus*, *Lepomis gulosus*, *L. megalotis*, *Micropterus coosae*, *Etheostoma coosae*, *E. jordani*, *E. stigmaeum*, *Percina nigrofasciata*, *P. palmaris*, and *Cottus caroliniae*. We hasten to add that the largest series (64 specimens) of *E. brevirostrum* was taken during the 14 October 1969 collection whereas only a single specimen was taken earlier that year, on 17 June.

**ETYMOLOGY:** The name *brevirostrum* is from the Latin *brevi* = short, and *rostrum* = beak or snout, and is descriptive of the short snout. This name was coined by John S. Ramsey in the early 1970s when he was actively studying the snubnose darters.

**COMPARISONS:** There is considerable overlap in meristic features among the three Alabama River system species compared here, *Etheostoma tallapoosae*, *E. coosae*, and *E. brevirostrum*, as shown in Tables 1-6. Although the modal vertebral count is 38 for all three, *E. coosae* averages higher than *E. tallapoosae* and *E. brevirostrum*. Both *E. tallapoosae* and *E. brevirostrum* typically have 5—5 branchiostegal rays, whereas *E. coosae* typically has 6—6 branchiostegals. Both *E. coosae* and *E. brevirostrum* have a red ocellus on the first interradiial membrane of the spinous dorsal fin. *Etheostoma tallapoosae* lacks the ocellus, as do the several undescribed species of *Ulocentra* known from below the Fall Line, and these species have color patterns suggesting that they, rather than *E. brevirostrum* and *E. coosae*, represent the closest relatives of *E. tallapoosae*. An examination of Figures 1-3 discloses a number of differences in color patterns of the nuptial males. *Etheostoma brevirostrum* is the only one of the three having a red band across the anal fin. Both *E. tallapoosae* and *E. brevirostrum* have a moderately wide band of bright red across the middle of the second dorsal fin, whereas *E. coosae* has nearly the entire fin covered with a very broad band of dull red. *Etheostoma brevirostrum* is the only species having yellow-cream and white haloed red blotches on the lower side. There are additional differences in the details of the spinous dorsal pigmentation and the arrangement, shape, and color of lateral blotches. Tables 7 and 8 give a comparison of proportional measurements of the three species (expressed in thousandths of standard length). In spite of their visibly different profiles, standard snout length measurement is little different among the three

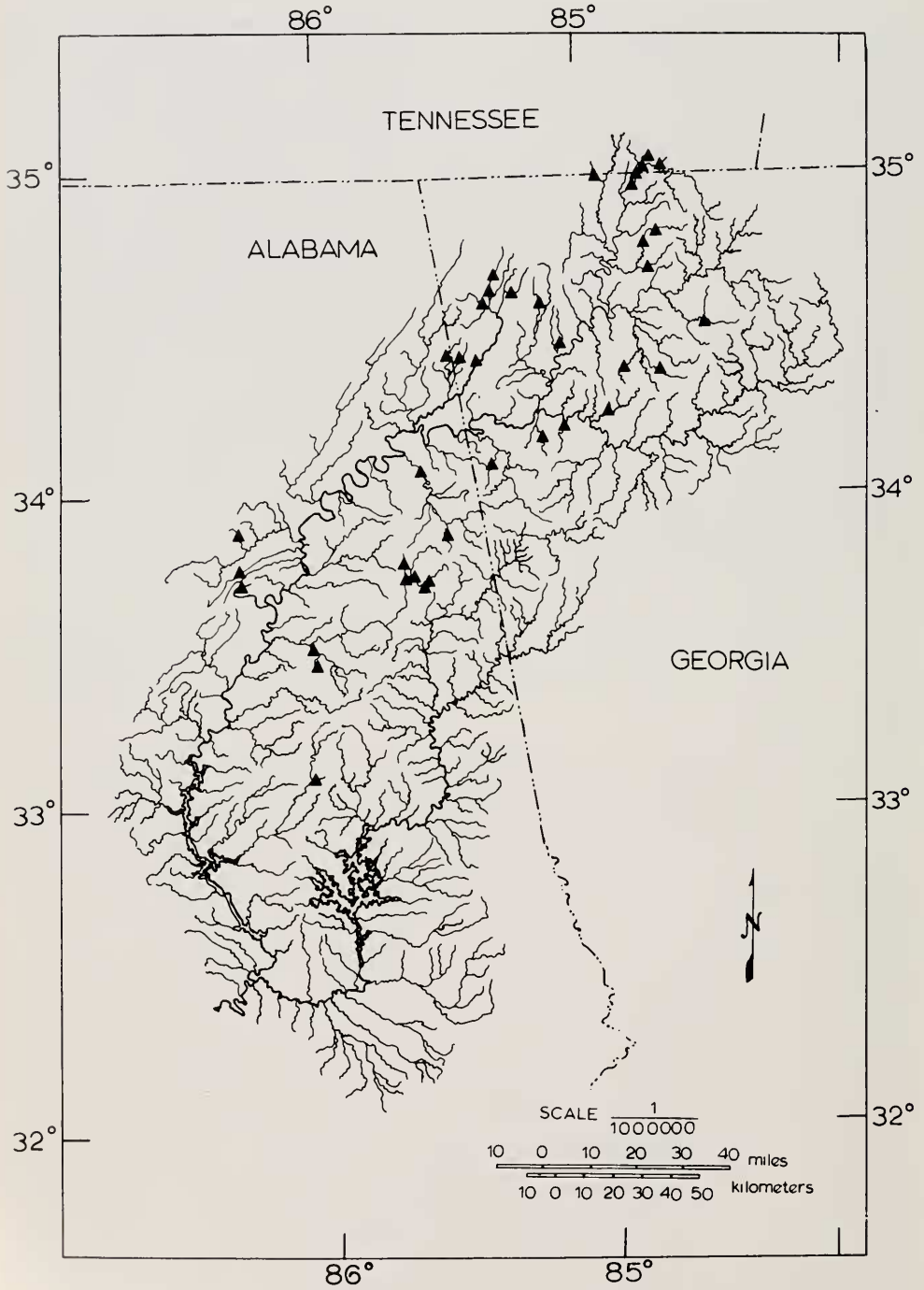


Figure 5. Distribution of *Etheostoma coosae* based on samples used for comparative material in this study.

species. The soft dorsal fin is longer in males and females of *E. coosae* than in either *E. brevirostrum* or *E. tallapoosae*. Both *E. tallapoosae* and *E. brevirostrum* males are similar in anal fin length, whereas male *E. coosae* have a longer anal fin. There is no apparent difference in anal fin length in females of the three species. *Etheostoma brevirostrum* has the longest first anal spine of the three species, with the difference apparent in both males and females.

Fowler (1945) described *Etheostoma coosae* using specimens collected from a small creek near Chesterfield, Cherokee County, Alabama. We collected additional topotypic material for our comparisons of *E. coosae* with *E. tallapoosae* and *E. brevirostrum*; the following is a list of collections of *E. coosae* that we used for the comparisons. The collection site records are presented on the drainage map of the Coosa River system (Figure 5).

COOSA RIVER SYSTEM, ALABAMA. COOSA COUNTY: TU 41138 (36), trib. to Hatchet Cr., 3.7 mi NE Goodwater, Ala Hwy 9. TALLADEGA COUNTY: TU 71903 (16), Kelly Cr., trib. to Cheaha Cr., 5 mi SW Munford, Ala Hwy 21; TU 152199 (29), Cheaha Cr., T17S, R6E, Sec 33. CALHOUN COUNTY: TU 69507 (1), Choccolocco Cr., 1 mi S White Plains, Ala Hwy 9; TU 59645 (4), Shoal Cr., 2.1 mi E White Plains; TU 40783 (23), Cottaquila Cr., trib. to Choccolocco Cr., 2.7 mi N White Plains, Ala Hwy 9. CLEBURNE COUNTY: TU 60352 (1), TU 152215 (27), and TU 154766 (10), Shoal Cr. at Pine Glen Recreation Area; TU 154789 (5), Terrapin Cr., Co. Rd. 55; TU 154750 (21), trib. to Shoal Cr., 7.1 mi N US Hwy 78. ST. CLAIR COUNTY: TU 26026 (1), Beaver Cr., 4 mi S Ashville, US Hwy 231; TU 26015 (11), Broken Arrow Cr., 9.0 mi N Pell City, US Hwy 231; TU 26037 (21), Muckleroy Cr., trib. to Big Canoe Cr., 4.0 mi NW Ashville, US Hwy 231. CHEROKEE COUNTY: TU 26067 (10), Mills Cr., trib. to Chattooga R., 3 mi ENE Chesterfield; TU 40768 (1), Terrapin Cr., 7.8 mi N Piedmont, Ala Hwy 9. COOSA RIVER SYSTEM, GEORGIA. FLOYD COUNTY: TU 32754 (42), Cave Springs Cr., trib. to Cedar Cr., Cave Springs, Rolater Park; TU 7865 (24) and TU 26111 (7), Silver Cr. at town of Silver Creek; TU 25962 (3) and TU 26118 (6), Spring Cr., trib. to Etowah R., 5 mi E Rome, US Hwy 411. CHATTOOGA COUNTY: TU 26081 (15), trib. to Chattooga R., 5 mi SW Lyerly, Ga Hwy 114; TU 33358 (6), Harrisburg Cr., 10.5 mi N Menlo, Ga Hwy 337; TU 34983 (16), trib. to Chattooga R., 5.3 mi W Lyerly; TU 26104 (8), trib. to Chattooga R., Lyerly, Ga Hwy 114; TU 27565 (2), spring trib. to Chattooga R., 0.2 mi E Alabama/Georgia state line, 5.3 mi W Lyerly; UT 91.1928 (15), West Fork Armuchee Cr., Ga Hwy 201, 8.9 mi NE junction US Hwy 27. WALKER COUNTY: TU 40678 (29), Duck Cr., 1.3 mi NE Center Post, Ga Hwy 337; TU 27574 (10), Cane Cr., trib. to Chattooga R., 2.5 mi E Point, 8.3 mi S Lafayette; TU 40688 (69), Duck Cr., 6.8 mi SW Lafayette off Ga Hwy 337, 0.2 mi E Bronco; UT 91.1929 (17), Cane Cr., US Hwy 27, 5.5 mi S junction with Ga Hwy 193, Lafayette. BARTOW COUNTY: TU 7393 (3), Little Pinelog Cr., 2 mi N White, US Hwy 411; TU 12076 (11), Cedar Cr., trib. to Pinelog Cr., 0.3 mi W Folsom, Ga Hwy 140. GORDON COUNTY: TU 35027 (31), Rocky Branch, trib. to Johns Cr., 10.5 mi W Calhoun, Ga Hwy 156. MURRAY COUNTY: CU 24908 (20) and TU 37543 (7), Rock Cr., trib. to Coosawattee R., 1.5 mi S Chatsworth, US Hwy 411; TU 27969 (3), Holly Cr., 0.5 mi E Chatsworth, US Hwy 76; TU 7328 (3), Rock Cr., trib. to Holly Cr., Ramhurst; UT 91.13 (3), Holly Cr., 3 mi E Eton; UT 91.1685 (13), Conasauga R., 0.5 river mile S Tennessee/Georgia state line; UT 91.1689 (27), Conasauga R., Ga Hwy 2; TU 121091 (1), Conasauga R., 0.9 mi W Gregory, Ga Hwy 225. PICKENS COUNTY: TU 40722 (27) and TU 38352 (7), Talking Rock Cr., 13.6 mi S Ellijay, Ga Hwy 5. COOSA RIVER SYSTEM, TENNESSEE. BRADLEY COUNTY: TU 65932 (12) and TU 121066 (15), Conasauga R., 12.9 mi SE Cleveland, Tenn Hwy 74; UT 91.280 (33), Mills Cr. at Tennessee/Georgia state line, E Red Clay. POLK COUNTY: UT 91.147 (21), Minnewauga Cr. near mouth; UT 91.248 (27), Conasauga R. at Boanerges Church bridge; UT 91.2836 (6), Old Fort Cr. near US Hwy 411.

#### ACKNOWLEDGMENTS

Study materials and distributional records of the three snubnose darters treated herein have been accumulating over the years, due to the efforts of a number of past Tulane graduate students and fellow faculty. They are in alphabetical order: Robert C. Cashner, Glenn H. Clemmer, John DeAbate, the late Gerald E. Gunning, Rudolph J. Miller, John S. Ramsey, and Bruce A. Thompson. We are also indebted to two anonymous reviewers. We are apprecia-

tive of the loan of material, collection data, and courtesies extended to us by Richard L. Mayden and Bernard R. Kuhajda, University of Alabama; Maurice F. Mettee and Patrick E. O'Neil, Geological Survey of Alabama; Henry L. Bart, Jr., Auburn University; B. J. Freeman, University of Georgia; and J. Malcolm Pierson, Alabama Power Company. We are most appreciative of the efforts of the many students at these various institutions.

We are greatly indebted to a number of individuals who have contributed significantly to our study by collecting, making observations, and taking photographs. Jeanne E. Suttkus helped collect and photograph snubnose darters in the late 1960s and early 1970s. More recently, we have had a tremendous amount of assistance and donations of slides by J. Malcolm Pierson, Maurice F. Mettee, Patrick E. O'Neil, Henry L. Bart, Jr., and B. J. Freeman.

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